Transforming Healthcare with hands-free smart glasses.



realwear

Image courtesy of Apprentice



Extended Reality and wearables continue to offer significant opportunities to revolutionize healthcare. However, for a true transformation in healthcare, it's vital that health services take more direct action and planning - particularly given current labor shortages and skills gaps. A real step change is needed.

In this article, by way of example, we're going to look at head-mounted wearables (in particular, assisted reality), and how this technology has unlocked transformational ways for healthcare services to better care for patients.

What is Extended Reality (XR)?



To begin with, there are various types of head-mounted wearables that fall under extended reality (XR). The umbrella term encompasses the following technologies:

- Virtual reality (VR), which plunges users into an all-digital, fully immersive experience.
- Augmented Reality (AR) and mixed reality (MR), an interactive experience that combines the real world and computer-generated content, where physical and digital objects may co-exist in a blended environment.
- Assisted Reality (aR), a technology that presents information to the user without blocking their vision. It's designed to assist the user in the completion of real-world tasks without interfering with their situational awareness.

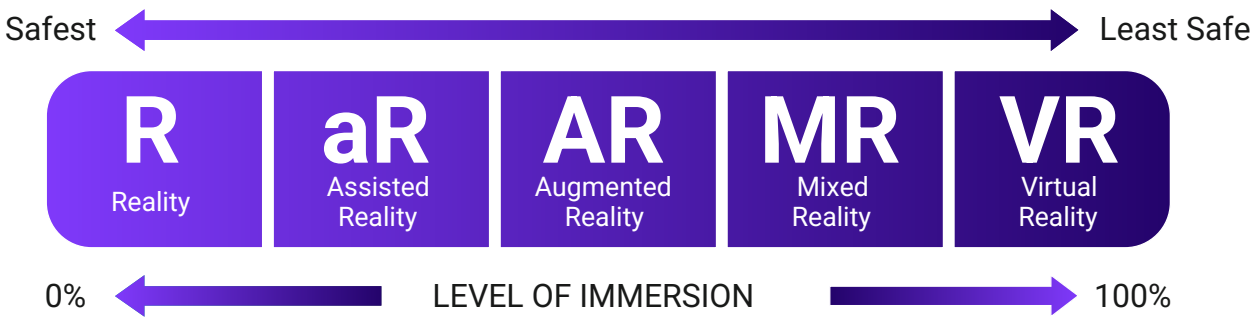




Image courtesy of RealMax

While virtual reality (VR) and augmented reality (AR) have garnered a lot of attention in recent years, it is assisted reality (aR) that has emerged as the real game-changer. Our experience has shown that many of these emerging technologies are not easy-to-use solutions that provide immediate value or quick returns on investment. In fact, they often require significant effort and investment to implement effectively.

To create VR and AR use cases, applications and environments must be built separately, and that adds a huge level of complexity into rolling it out within the healthcare sector. Therefore, a successful deployment for some of these ‘immersive’ technologies, where digital is overlaid on the physical world, or even replaces it, requires significant investment, time, patience, and planning with change management.

Leveraging What's Here Now: Assisted Reality (aR) for immediate Results

Assisted Reality is a newer and rapidly emerging XR technology, which lies on the opposite end of the XR spectrum to VR. Unlike VR, assisted reality technologies provide a 'reality first, non-immersive experience', adding in digital content and experiences designed to "assist" the user with their physical task. The user can consume information and collaborate with others, but these experiences are intentionally separated from the user's physical reality to keep the user present and mindful of his/her surroundings. As a driver gathers information from glancing at a dashboard, an assisted reality user is presented with information in much the same manner.

One company at the forefront of the Assisted Reality industry is RealWear. Their unique devices are head-mounted, voice-controlled wearables that provide the user with information via a micro-display that fits just below their line of sight. There are numerous industry and use case specific applications available on the platform such as the popular Microsoft Teams, Cisco WebEx Expert on Demand, HandsFree for Zoom, TeamViewer to name a few.



Image courtesy of Norwegian Centre for E-health Research

The practical technology is well suited to offer remote expert guidance, digital work instructions, field service support, and other use cases where a 'reality-first' experience is required. aR solutions need to provide users with hands-free control via voice command capabilities. In addition, with safety as a baseline imperative, this technology must be suitable for use throughout the industry and adhere to overhead bands, clean room straps and other PPE, without interfering with face masks and eye protection. It must provide the comfort and battery power to accommodate shift-long device use.

Current use cases of Assisted Reality in healthcare

Within healthcare, assisted reality is being used across a variety of use cases.

Education & Knowledge Transfer

Providing the ability to pass expertise from a surgeon to medical students, this use case helps to support transitional students that are going to be working on the frontline. The process brings about awareness and provides tangible examples as to what they'll be encountering. The technology also speeds up the learning process and takes remote personnel into environments that they can't physically be in.

Operating theatres are a prime example of this as you can't have many people inside during the procedure. They're small environments, there's infection control to consider, and a large group could present a significant distraction to the surgeon performing the procedure. To counter this, assisted reality wearables can facilitate a remote session whereby students can join the live surgery virtually and partake in bi-directional conversation with the surgeon wearing the device. This gives medical students a real-time, remote first-person view and insight that has never been available before.



Image courtesy of Medical Note



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Use Case in Action: NHS

One NHS Trust that is leveraging RealWear's solution is a pioneer in innovation. Their team lined up a project in which they tried and tested various headsets across the XR spectrum. Ultimately, they landed on RealWear because their devices are ruggedized, offer great visibility and viewability from the display, and are well suited to those carrying out a procedure. The Trust's main use case was in orthopedics whereby the surgeon wore the device to allow students to join virtually from a number of different disciplines. The remote audience was able to view the experience and communicate with the surgeon throughout

Community Nursing

Community nursing is where patients are visited in their own homes by a medical professional rather than physically coming into a hospital or a GP practice. This is largely the way that a lot of care is going to be delivered in the future. When nurses enter those environments, they may need immediate access to an expert or senior team member who can offer either sign-off, diagnose, or provide guidance on treatment. This is a fantastic use case because it speeds up so many patient treatment processes and enables expertise to be shared easily amongst colleagues.



Image courtesy of Jodacare AS

Use Case in Action: Podiatry

One example of this use case in action is the use of assisted reality wearables by podiatrists in a community clinic to support real-time contact with other healthcare professionals to seek advice on how best to treat patients. Remote based senior podiatrists can immediately help support treatment and care, and even be part of the conversation with the patient. Since deploying the technology, the community clinic has seen a reduction in travel, an increased efficiency in delivery of care and a decrease in treatment delays.

Emergency Medical Technicians (EMT)

Assisted reality wearables enable EMT workers to receive live support from experts based back at the hospital to let them know about a patient that will be arriving soon. This results in better care for a patient in critical condition. EMT workers can also get guidance from specialists and subsequently perform more advanced treatment in the field.



Image courtesy of Jodacare AS

Use Case in Action: First Responders

An organization that RealWear works with in Norway has deployed assisted reality wearables to first responders and paramedics. As Norway is a very rural country, ambulances can often be hours away from the patient, so the technology is helping first responders provide eyes on the ground to a situation before the ambulance crew arrives. For instance, in the case of a road traffic collision, those paramedics who are travelling to the incident can provide patient triage as they know what to prepare, which hospitals to go to and how to prioritize that patient.

Emerging use cases for Assisted Reality

Whilst the above use cases are already in practice today, we're only just scratching the surface in terms of the capabilities of this technology.

Hazardous Environments

Other areas in healthcare that will seriously benefit from assisted reality wearables being deployed are hazardous environments. The COVID-19 pandemic is a prime example, where you had to have limited numbers of people on hospital wards. The ability to take an assisted reality head-mounted wearable into a heavily limited environment and have remote guidance is invaluable. This also applies to remote patient assessment and second opinions.



For instance, assisted reality enables the wearer to have immediate access to an expert who may be based in a completely different location or only have a small window to speak with a patient in between their own meetings. Therefore, an experienced doctor, consultant, physician, can join a video call and guide the person on the ground and give that second opinion or assessment remotely.

Facilities Management

Looking ahead, there are additional use cases to be explored which will provide significant value. One such example is facilities management. If we step away from direct patient care and look at the hospital's facilities, they're filled with complex machinery. With a lot of it being legacy equipment due to a lack of funding, machinery is more likely to break down or require repairs at a moment's notice.



Assisted reality wearables have the capability to improve the process of scheduled maintenance and pre-scheduled equipment checks, or simply reduce downtime. People on the ground can get in touch with specialists from the equipment manufacturers via the device and carry out the work in real time, rather than wait for a visit from a technician

How this technology is geared up for frontline healthcare workers

It’s important to note that a key component is the environment in which assisted reality is being used. In the community, you're not going to be connecting to a patient's Wi-Fi when you go into their house, because that would present far too many issues with security compliance and connectivity. To combat this, RealWear has released a 4G modem that can be plugged directly into a headset and can connect the device wherever 4G connectivity is available.

This means that the user wearing the device is always securely connected and can step into any environment with the necessary support. As the Workband included with each device isn’t suitable in terms of infection control, RealWear also has overhead bands and different forms of PPE mounting solutions that are wipeable with up to 97% ethanol. This keeps the device sanitized, so that it can be used in sterilization units as well.



Image courtesy of RealMax

Assisted Reality wearables are actively improving and speeding up the effectiveness of patient outcomes in the healthcare settings that have deployed this technology, and we’re just scratching the surface, with more and more use cases becoming apparent. The key factor in this is accessibility. There’s a small learning curve in getting to grips with this technology, so deployment can be carried out quickly. Once adopted, assisted reality wearables ease the strains on the day-to-day requirements of people's roles within healthcare and, like all advancements in modern medicine, will ultimately help to improve patient outcomes and save lives.

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